Confirmation No. 5345

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellant:	FAN	Examiner:	Le, Dinh T.
Serial No.:	10/570,050	Group Art Unit:	2816
Filed:	February 27, 2006	Docket No.:	US030282US2 (NXPS.276PA)
Title:	METHOD AND SYSTEM FOR PASSBAND RIPPLE CANCELLATION IN CASCADING FILTERS		

APPEAL BRIEF

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Dear Sir:

This Appeal Brief is submitted pursuant to 37 C.F.R. §41.37, in support of the Notice of Appeal filed July 19, 2010 and in response to the rejections of claims 1-6, 9-18 and 21-25 as set forth in the Final Office Action dated April 22, 2010.

Please charge Deposit Account No. 50-4019 (US030282US2) **$540.00** for filing this brief in support of an appeal as set forth in 37 C.F.R. §1.17(c). If necessary, authority is given to charge/credit Deposit Account 50-4019 additional fees/overages in support of this filing.

I. Real Party In Interest

The real party in interest is NXP Semiconductors. The application is presently assigned of record, at reel/frame nos. 019719/0843 to NXP, B.V., headquartered in Eindhoven, the Netherlands.

II. Related Appeals and Interferences

While Appellant is aware of other pending applications owned by the above-identified Assignee, Appellant is unaware of any related appeals, interferences or judicial proceedings that would have a bearing on the Board's decision in the instant appeal.

III. Status of Claims

Claims 1-6, 9-18 and 21-25 stand rejected and are presented for appeal. Claims 7-8 and 19-20 were previously cancelled. A complete listing of the claims under appeal is provided in an Appendix to this Brief.

IV. Status of Amendments

No amendments have been filed subsequent to the Final Office Action dated April 22, 2010.

V. Summary of Claimed Subject Matter

As required by 37 C.F.R. § 41.37(c)(1)(v), a concise explanation of the subject matter defined in the independent claims involved in the appeal is provided herein. Appellant notes that representative subject matter is identified for these claims; however, the abundance of supporting subject matter in the application prohibits identifying all textual and diagrammatic references to each claimed recitation. Appellant thus submits that other application subject matter, which supports the claims but is not specifically identified above, may be found elsewhere in the application. Appellant further notes that this summary does not provide an exhaustive or exclusive view of the present subject matter, and Appellant refers to the appended claims and their legal equivalents for a complete statement of the invention.

Commensurate with independent claim 1, an example embodiment of the present invention is directed to a composite filter (*see, e.g.*, filter 200 shown in Fig. 2, and page 3:12-17) comprising an electronic circuit including at least two cascading filters of different orders (*see, e.g.*, filters 202 and 204 shown in Fig. 2, and page 3:12-17) and having passband ripples with respect to signal gain of the respective filter at frequencies in a passband of the respective filter and nearly equal in magnitude and out of phase with respect to each other in order to minimize a passband ripple in the composite filter (*see, e.g.*, page 4:3-8), wherein the orders of the two cascading filters differ in value by exactly one (*see, e.g.*, page 3:18-24).

Commensurate with independent claim 11, an example embodiment of the present invention is directed to a method for passband ripple cancellation in cascading filters to minimize a passband ripple in a composite filter (*see, e.g.*, filter 200 shown in Fig. 2, and page 3:12-17) comprising the steps of: providing, in an electronic circuit, at least two filters of different orders (*see, e.g.*, filters 202 and 204 shown in Fig. 2, and page 3:12-17) and having passband ripples with respect to signal gain of the respective filter at frequencies in a passband of the respective filter and nearly equal in magnitude and out of phase with respect to each other in order to minimize the passband ripple in the composite filter (*see, e.g.*, page 4:3-8), wherein the orders of the two cascading filters differ in value by exactly one (*see, e.g.*, page 3:18-24).

VI. Grounds of Rejection to be Reviewed Upon Appeal

A. Claims 1-2, 4-6, 9-12, 14-18, 21 and 24-25 stand rejected under 35 U.S.C. § 103(a) over Hwang *et al.* (U.S. Patent No. 6,678,511).

B. Claims 3, 13 and 22-23 stand rejected under 35 U.S.C. § 103(a) over Hwang *et al.* (U.S. Patent No. 6,678,511) in view of Chan *et al.* (U.S. Patent No. 6,920,471).

C. Claims 1-2, 4-6, 9, 11-12, 14-16, 18, 21 and 24 stand rejected under 35 U.S.C. § 103(a) over Jeanjean *et al.* (U.S. Patent No. 6,954,119) in view of Hwang *et al.* (U.S. Patent No. 6,678,511).

VII. Argument

Overview: The § 103 Rejections Fail to Show All Claim Limitations Or Provide A Valid Motivation To Modify The Asserted Reference(s).

The § 103 rejections over the '511 reference are based on a "routine experimentation" or "obvious to try" assertion that ignores the teaching-away evidence and contradicts one of the two situations, as explained in *In re Kubin*, in which the "obvious to try" standard may not be applied. 561 F.3d 1351 (Fed. Cir. 2009).The Examiner acknowledges that the asserted '511 reference does not expressly teach the invention as a whole, including aspects of the claimed invention that address the problem of having bandpass ripples carried through a circuit by implementing a composite filter that includes, among other aspects, two cascading filters having orders that differ by exactly one. In stark contrast, cascading filters of the '511 reference have respective orders of nine and two or four.

In a first rejection, the Examiner proposes to modify the '511 reference to change the order of these filters for optimization in contrast with the express teaching of the '511 reference that optimization would be achieved, not by adjusting the orders of the filters as suggested by the Examiner, but rather by adjusting aspects of the amplifier and attenuator circuits in the Examiner's relied-upon embodiment. The Examiner provides no reason why the skilled artisan would be led along such a divergent research path involving entirely different parameters (adjustments to the filters as opposed to amplifier and attenuator circuits) and encompassing an unlimited number of possible combinations (involving all possible combinations of orders for the filters) of which the prior-art of record provides a hint of success only for the respective orders of nine and two or four.

Although the Examiner continues to maintain the first rejection solely over the '511 reference, the Examiner has recently issued a second § 103 rejection of the claims over the '119 reference in light of the '511 reference, which implies that the first rejection is lacking. This second rejection identifies a set of cascaded filters having an order differing exactly by one as a starting point and attempts to modify these cascaded filters out of context according to the '511 reference. In doing so, the Examiner improperly ignores the majority of the '119 reference which teaches away from the proposed combination.

- The impropriety of these rejections is explained in more detail below. Deficiencies of other appealed rejections are discussed thereinafter.

A. The § 103 Rejections Of Claims 1-6, 9-18, And 21-25 Over The '511 Reference Improperly Apply An Obvious to Try Standard In Lieu of Motivation.

Claims 1-2, 4-6, 9-12, 14-18, 21 and 24-25 are rejected solely over the '511 reference. Claims 3, 13, and 22-23 are rejected on similar grounds based upon the '511 reference in view of the '471 reference.

The rejections over the '511 reference are improper because they fail to show all claimed aspects, including, *e.g.*, cascaded filters orders of the filters differ by exactly one. The '511 reference, as acknowledged by the Examiner, does not teach that the orders of the filters differ by exactly one, as claimed. Instead, the only concrete examples provided by the '511 reference show filters having orders that differ by significantly more than one (*e.g.*, 9 stage and 2 or 4 stage). *See, e.g.*, Col. 4:64 to Col. 5.16. The Examiner erroneously concludes that these aspects of the claimed invention are obvious because routine experimentation would have led the skilled artisan to select filters having orders that differ by exactly one in the '511 reference. However, the evidence put forth by the Examiner is little more than a conclusion that orders of the filters differing by exactly one is an obvious design choice to reach a condition which is "optimum" for some unspecified end goal. The ultimate conclusion of the Examiner is not supported by the record and ignores Appellants' evidence of non-obviousness.

The obvious to try standard is only appropriate where there is a recognized problem or need in the art, and there are a finite number of identified predictable solutions to the recognized need or problem that one skilled in the art could pursue with a reasonable expectation of success. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007); *See also,* M.P.E.P. § 2143(E). Finite means that the number of solutions is, "in the context of the art, small or easily traversed." *Ortho-McNeil Pharm. Inc. v. Mylan Labs., Inc.*, 520 F.3d 1358, 1364 (Fed. Cir. 2008). As explained in *In re Kubin,* the "obvious to try" standard may not be applied in situations (such as here) where one would have "to vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result, where the prior

art gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful." 561 F.3d at 1359.

Applicant submits that the rejections are improper because the Examiner's suggested optimization requires a skilled artisan to try an infinite number of possible filter orders without providing any direction as to which of the many possible choices is likely to be successful. The '511 reference does not provide any direction as to which of the infinite number of filter order combinations is likely to be successful. Instead, the only working filter examples shown by the '511 reference deal with a specific concave-shaped ripple that is taught by the '511 reference to be adjusted by varying the parameters of attenuator and amplifier circuits, not by varying the orders of the filters. In view of this limited disclosure, the Examiner has not provided evidence that suggests that experimentation with such ripple characteristics would lead the skilled artisan to filters differing by exactly one and the '511 reference does not provide any direction for the skilled artisan to experiment with the orders of the filters. Thus, the experimentation suggested by the Examiner is an improper application of the "obvious to try" standard, which would unduly include trying each of numerous possible choices of filter orders with no direction as to which of the many possible choices is likely to be successful.

For example, the Examiner's reasoning would be applicable to an infinite number of filter combinations because the Examiner's logic has no reliance upon teachings of the actual order of the filters. If Appellant had discovered that using filters differing in order by twenty or sixty or one million, the Examiner's argument would not change. For example, by the Examiner's logic, it would also be an obvious design choice to modify the filters of the '511 reference to have orders differing by twenty or sixty or one million for the purpose of cancelling ripple. However, no evidence is provided to suggest how or why a skilled artisan would choose the claimed filter order out of these other possible solutions other than the Examiner's conclusion. For the Examiner to maintain the rejection on the evidence provided, the Examiner would have to conclude that an infinite number of filter combinations are obvious in view of only a few concrete filter circuit examples.

The Examiner's position to arbitrarily increase the order of the filters as "a matter of electrical design" further ignores technical challenges known in the art and is contrary to the

requirement that there be a finite number of solutions before the obvious to try rational is applied. *See, KSR,* 550 U.S. at 421. In order for a set of possible solutions to be finite, the number of solutions must be, "in the context of the art, small or easily traversed." *Mylan Labs*, 520 F.3d at 1364. As explained below, the possible set of filter orders combinations are not easily traversable as to support the Examiner's obvious-to-try rationale.

The Examiner specifically asserts that it would be obvious to arbitrarily increase the order of the second filter of the '511 reference from an order of two to an order of eight through experimentation to optimize the filter of the '511 reference. However, this position ignores a number of challenges faced in the area of filter design. It is self evident that increasing the filter order requires additional circuitry, which increases the expense of both design and production. These considerations (and teaching-away) aside, the order of the filter is not a simple variable that can easily be modified to adjust one parameter independent of other circuit parameters, as proposed. Rather, the '511 reference teaches that increasing the filter order affects stop band attenuation characteristics, insertion loss, center frequency, flatness at each end of the filter, *etc. See, e.g.,* Col 1:32-39. As one example, the '119 reference states that, "[i]n designing filters, the filter designer is aware that component sensitivity increases with the filter order. The latter should therefore be held as low as possible consistent with the filter specifications." (See Col 2:26-29). Given difficulties related to modification of the filter order, such as sensitivity, and the number of circuit parameters affected, increasing the filter order may require extensive circuit analysis and modifications to determine and compensate for all affected aspects of the design. In light of the above, Appellant submits that possible filter orders are not easily traversable as to support the Examiner's obvious-to-try rationale.

For at least the aforementioned reasons, Appellant respectfully submits that the rejections are improper and requests that they be withdrawn.

B. The § 103 Rejections of Claims 1-6, 9-18, and 21-25 Over the '511 Reference Are Improper Because The '511 Reference Teaches Away From Filters That Have Orders That Differ By Exactly One

Claims 1-2, 4-6, 9-12, 14-18, 21 and 24-25 are rejected solely over the '511 reference. Claims 3, 13, and 22-23 are rejected on similar grounds based upon the '511 reference in view of the '471 reference.

The '511 reference teaches away from experimentation involving the orders of the filters 20 and 12 as proposed by the Examiner. Consistent with the recent Supreme Court decision, M.P.E.P. § 2143.01 explains the long-standing principle that a § 103 rejection cannot be maintained when the asserted modification undermines either the operation or the purpose of the main ('511) reference - the rationale being that the prior art teaches away from such a modification. *See, KSR,* 550 U.S. at 416 ("[W]hen the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be non-obvious."). In this instance, the '511 reference teaches that the impact of the counter-ripple is adjusted, not by experimentation with the orders of the filters 20 and 12, but by using the taught orders of the filters (*e.g.,* 9 stage and 2 or 4 stage) and varying other parameters such as the gains of the filter 12 and the amplifier circuit 11 and the attenuation characteristic of the first attenuator circuit 13. *See, e.g.,* Figure 4c and Col. 5:47-55. The '511 reference further teaches additional embodiments that involve adjusting the counter-ripple by varying parameters of amplifier 11 and attenuators 13 and 14. *See, e.g.,* Col. 6:35-63. Thus, the '511 reference teaches adjusting the counter-ripple to correct the whole pass band flatness of the band pass filter by experimenting with parameters of amplifier and attenuator circuits, not by experimentation with the orders of the filters. As such, the '511 reference expressly teaches away from experimentation involving changing the orders of the filters. Accordingly, there is no motivation for the skilled artisan to modify the '511 reference in the manner proposed by the Examiner.

For at least the aforementioned reasons, Appellant respectfully submits that the rejections are improper and requests that they be withdrawn.

C. The § 103 Rejections of Claims 1-6, 9-18, and 21-25 Over The '511 Reference Are Improper Because Appellant's Disclosure Is The Only Evidence Of Record That Teaches That Filters Differing By Exactly One Would Be Advantageous.

Claims 1-2, 4-6, 9-12, 14-18, 21 and 24-25 are rejected solely over the '511 reference. Claims 3, 13, and 22-23 are rejected on similar grounds based upon the '511 reference in view of the '471 reference.

The Examiner has impermissibly used Appellant's teachings as the basis for the conclusion of obviousness. In this instance, the Examiner's assertions regarding routine experimentation require that the skilled artisan impermissibly work backward from Appellant's specification. The Examiner circularly requires that the skilled artisan realize that filters differing in order by exactly one provide the advantageous features taught only by Appellant's specification. For these reasons, the record suggests that the Examiner has impermissibly used Appellant's teachings as the basis for the conclusion of obviousness. Absent Appellant's specification, there is nothing in the record that would suggest to the skilled artisan that filters differing by exactly one would be advantageous.

Thus, Appellant respectfully submits that the rejections are improper and requests that they be withdrawn.

D. The § 103 Rejections of Claims 1-6, 9-18, and 21-25 Over The '511 Reference Are Improper Because The Examiner's Reliance Upon Routine Experimentation Is Improper.

Claims 1-2, 4-6, 9-12, 14-18, 21 and 24-25 are rejected solely over the '511 reference. Claims 3, 13, and 22-23 are rejected on similar grounds based upon the '511 reference in view of the '471 reference.

The Examiner has improperly relied upon routine experimentation to support the conclusion of obviousness without first establishing that the prior art discloses an overlapping range. In order to rely upon routine experimentation to assert obviousness, the Examiner must first establish that the prior art discloses an overlapping range. *See, e.g.,* M.P.E.P. § 2144.05 ("In the case where the claimed ranges "overlap or lie inside ranges

disclosed by the prior art" a *prima facie* case of obviousness exists."). In this instance, the '511 reference only discloses a few exact implementations of the orders of the filters and does not otherwise disclose a range (leaving an infinite number of possibilities for the skilled artisan to experiment with), thus there is not any evidence of an overlapping range.

Moreover, any presumption of obviousness of ranges has been rebutted by the criticality of the claim limitations taught by Appellant's specification. As discussed in M.P.E.P. § 2144.05, even where there are overlapping ranges, the obviousness can be rebutted by a showing of criticality. Appellant's disclosure teaches that implementing a composite filter with orders of filters differing by exactly one is a critical aspect of the claimed invention. The surprising results of this specific configuration are shown in Tables 1-3. Appellant has therefore rebutted any showing of obviousness due to overlapping ranges. Accordingly, the '511 reference does not render the claimed invention obvious and the rejections must be withdrawn.

E. The § 103 Rejections Of Claims 1-2, 4-6, 9, 11-12, 14-16, 18, 21 And 24 Over The '119 Reference In View Of The '511 Reference Are Improper Because The References Teach Away From The Proposed Combination.

The rejections are improper because the '119 reference teaches away from the combination with the '511 reference as proposed by the Examiner. Consistent with the recent Supreme Court decision, M.P.E.P. § 2143.01 explains the long-standing principle that a § 103 rejection cannot be maintained when the asserted modification undermines either the operation or the purpose of the main ('511) reference - the rationale being that the prior art teaches away from such a modification. *See, KSR,* 550 U.S. at 416 ("[W]hen the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be non-obvious."). "If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." M.P.E.P. § 2143.01 citing to *In re Ratti*, 270 F.2d 81 (CCPA 1959).

Appellant submits that the combination of the primary '119 reference as modified by the secondary '511 reference is insufficient to establish a sustainable rejection, because the proposed modification is contrary to the central teachings of the primary '119 reference. In particular, the '119 reference is primarily directed towards the approximation of a high order filter using two or more carefully selected lower order filters having specific relationships. The Examiner's proposal would abandon these specific relationships to result in a filter that does not approximate a higher order filter behavior (the primary purpose of the '119 reference). The specifics of the proposed rejection and the improper nature thereof are discussed in more detail hereafter.

It is not disputed that the primary '119 reference is not at all concerned with (nor suggests) designing filters to have passband ripples of nearly equal magnitude that are also out of phase with each other. The primary purpose of the '119 reference is to approximate a higher order filter by careful design of a cascade of two lower-order filters (*see, e.g.*, Col. 4:43-61). To accomplish this goal, the '119 reference teaches how to create the desired filter characteristics by constructing each lower order filter to have a transfer function wherein the poles and/or zeros of the transfer function are a subset of the higher order filter (*see, e.g.*, Col. 5:5-10). In particular, the primary '119 reference teaches that this is accomplished through the careful selection of resistive, capacitive and inductive values (*see, e.g.*, Col. 5:10-15).

In contrast to these teachings, the Examiner proposes to replace the second of the lower order filters of the '119 reference with an inverse complementary bandpass filter taught by the '511 reference. However, these filters exhibit distinctly different output. As shown by the transfer functions in Figs. 6A and 6B of the '511 reference, this complementary band pass filter has a different response than a traditional band pass filter (*e.g.*, the transfer function looks perhaps more similar to a notch filter). Appellant submits that modification of these carefully selected component-based characteristics taught in the '119 reference would impermissibly frustrate the primary purpose of the '119 reference by moving the poles and zeroes. The Examiner's conclusions are improper because they fail to recognize or consider the differences between a complimentary band pass filter and a more-traditional band pass filter. Accordingly, the Examiner's apparent suggestion to modify the filter of the '119

reference, in a manner that is contrary to the central teachings thereof, renders the rejection improper.

Appellant further submits that the Examiner's response to arguments section does not address the substance of Appellant's arguments in this regard. Instead, the Examiner's response impermissibly overlooks the particular teachings of the '119 reference. In pertinent part, the Examiner does not address that the '119 reference's central teachings are directed toward a specific relationship of poles and zeroes between the two filters and that the proposed modification would depart from these teachings in favor of open-ended experimentation. As such, Appellant submits that the record stands uncontroverted regarding the impropriety of the proposed combination. Accordingly, the rejections cannot be sustained and Appellant respectfully requests that they be reversed.

F. The § 103 Rejections Of Claims 1-2, 4-6, 9, 11-12, 14-16, 18, 21 And 24 Over The '119 Reference In View Of The '511 Are Improper Because The Proposed Combination Is The Product Of Hindsight Reconstruction.

The Examiner has impermissibly used Appellant's teachings as the basis for the conclusion of obviousness. A legal conclusion of obviousness must only take into account knowledge which was within the level of ordinary skill in the art at the time the claimed invention was made and must not include knowledge gleaned only from Appellant's disclosure. *See,* M.P.E.P. § 2145. The record suggests that the Examiner has impermissibly used Appellant's teachings as the basis for the conclusion of obviousness.

As detailed above, the Examiner's proposed modification uses the '119 reference solely to assert correspondence to two cascaded filters having order differing by exactly one. As such, the Examiner's proposed modifications ignore and contradict all primary teaching of the reference. The Examiner has not presented any support or explanation why one skilled in the art would abandon all teachings of the '119 reference but maintain a filter ordering that differs by exactly one. Absent Appellant's specification, there is nothing in the record that would suggest to the skilled artisan that filters differing by exactly one would be advantageous. Applicant submits that the Examiner has simply identified a set of cascaded filters having orders differing by one (which can be found in any number of references) and

then incorporated this aspect into the '511 reference, using the claimed invention as a template. This is the hallmark of improper hindsight reconstruction with the proposed combination being derived, not "on the basis of the facts gleaned from the prior art," but solely from Applicant's disclosure. *See, e.g.,* M.P.E.P. § 2142. Accordingly, the rejections are improper and Appellant requests that they be reversed.

G. The § 103 Rejections of Claims 3, 13 And 22-23 Over The '511 Reference In View Of The '471 Reference Are Improper Because The References Fails To Show All Claim Limitations And A Valid Basis To Modify The '471 Reference Has Not Been Presented.

The Examiner asserts that use of digital filters are well known in the art but fails to provide any evidence or showing that there would be a reasonable expectation of success in applying a digital filter to the '511 reference as required by M.P.E.P. § 706.02(j). In contrast, the only support in the record indicates that the benefit, cited as a motivation to combine the references, will be defeated by the proposed combination. Furthermore, the motivating problem which the Examiner claims is solved by the suggested combination is not present in the filter of the '511 reference but rather is presented and solved by the proposed combination. Specifically, The Examiner suggests that it would be obvious:

> "to replace the analog type of the second filter (10) of [the '511 reference] with a digital type as suggested by [the '471 reference] for the purpose of compensating for the absolute sampling and digital delays associated with a matching circuit of the filters."

See, Final Office Action, page 5. As explained below, the '471 reference teaches that this benefit would not be provided when combined with the '511 reference as suggested.

The '471 reference makes clear that the disclosed "[filter] for delay correction is only good up to the frequency when the slope becomes negative." *See,* Col 4:36-39. The '471 reference discloses that this transition frequency is "close to 100 kHz." *See,* Col 4:40-43. In contrast to this limited operating range, the Examiner proposes to implement these teachings at frequencies greatly exceeding the stated limits (operating in the frequency range of 790 to 890 MHz). *See,* Figure 9 and Col 4:61-5:5 of the '511 reference. Applicant submits that when operating at these higher frequencies, which are 7000 times the disclosed operable limit of

100 kHz, the filter of the '471 reference would be unable to provide the delay correction cited as the motivation for the proposed combination. Therefore, a valid basis for motivation has not been presented.

Additionally, as stated above, the motivating problem which the Examiner claims is solved by the suggested combination is not present in the filter disclosed in the '511 reference. The Examiner suggests that one would be motivate to combine the teaching of the references to compensate for "absolute sampling and digital delays." *See,* Final Office Action, page 5. As discussed throughout the '471 reference, these problems are only taught to be presented by "digital impedance matching circuits." *See*, Col 1:35-38. Applicant submits that the '511 reference does not discuss "digital impedance matching circuits" or even include the word "digital." Because, the '511 reference does not include digital features, there is no need to compensate for absolute sampling and digital delays. Applicant submits that the suggested modification of the '511 reference to add a digital filter introduces the problem which the Examiner asserts as motivation. Because, the '511 reference does not include digital circuitry and the problems associated therewith prior to the suggested modification, the motivation suggested by the Examiner is lacking.

Accordingly, Appellant respectfully requests the rejections be reversed.

H. The § 103 Rejections Of Claim 21 Over The '511 Reference Is Improper Because The '511 Reference Fails To Show All Claim Limitations And A Valid Basis To Modify The '511 Reference Has Not Been Presented.

The rejection of claim 21 over the '511 reference is improper for failing to show correspondence to the claim limitations including, for example, one of the cascading filters being a third order filter and the other of the cascading filters being a fourth order filter. In contrast, as discussed above, the '511 reference discloses a ninth order filter and a second order filter. The Examiner asserts that it would be obvious to decrease the order of the first filter through routine optimization and increase the order of the second filter through routing optimization, but fails to provide valid support for this position. Not only does the '511 reference fail to suggest any modification to the first filter, the proposed optimization of the first filter conflicts with the proposed optimization of the second filter such that no optimization can be achieved.

As described above, the '511 reference includes two filters which each produce a ripple. The '511 reference clearly teaches that ripple reduction is the result of inverted ripples of the second filter cancelling out ripples of the first filter. (*See,* Col 3 8-17). In the rejection of claim 1, the Examiner suggests to adjust the order of the second filter to optimize cancellation of ripple produced by the first filter. *See,* Final Office Action, page 9. Conversely, in the rejection of dependent claim 21, the Examiner proposes to optimize the first filter in order to optimize cancellation of ripple produced by the second filter.

Appellant submits that optimization of one filter to cancel ripple of a second filter requires that the second filter remain unchanged during optimization. By "optimizing" both filters at the same time, as suggested, it is impossible to know whether any measured improvement or deterioration is due to a change to the first filter, the second filter, or both. For example, the globally optimal setting for the first filter may be tested and determined to be non-optimal if the second filter setting conflicted with the first filter. As a result, an optimal result may only be found if settings of the first and second filters happen to be adjusted to optimal positions simultaneously. Accordingly, Appellant submits that it does not make sense to "optimize" both filters at the same time as asserted in the combined rejections of claim 1 and dependent claim 21. Furthermore, Appellant submits that one skilled in the art would not be motivated to optimize the second filter following optimization of the first filter because ripple cancelation would already be optimized after the first optimization. Therefore, there is no valid reason why one skilled in the art would be motivated to modify the order of both filters for optimization as suggested by the Examiner. To Appellant's knowledge, there is nothing in the '511 reference, or the references of record, to suggest any benefit resulting from a modification of the first bandpass filter.

Accordingly, a valid basis to modify the order of the first filter has not been presented and Appellant respectfully request the rejection be reversed.

I. The § 103 Rejections of Claim 24 Over The '511 Reference And Over The '119 Reference In View Of The '511 Reference Are Improper Because The Rejections Are Based On An Invalid Assertion.

The § 103 rejections of claim 24 on the basis of routine optimization are improper because the Examiner has not presented a valid support for the rejection. In order to characterize the determination of an optimum or workable ranges of a variable as routine experimentation, "[a] particular parameter must first be recognized as a result-effective variable, *i.e.,* a variable which achieves a recognized result." *See,* M.P.E.P. § 2144.05(II)(B), *Quoting, In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). The Examiner proposes to optimize bandwidth through an adjustment of filter orders. In support, the Examiner asserts that "a filter with higher orders would provide a bandwidth wider than the bandwidth of a filter with lower orders" but fails to provide support for this position. *See,* Final Office Action, p. 4. This assertion forms the basis for the Examiner's rejection, *i.e.*, that filter order would be adjusted for the purpose of increasing bandwidth. Appellant submits that the filter order is not directly-related to the bandwidth of the filter (*e.g.*, filters of varying orders can be designed for virtually any bandwidth). Therefore, the order of the filters is not a result-effective variable of bandwidth.

Accordingly, the rejection is improper and Appellant requests that it be withdrawn.

VIII. Conclusion

In view of the above, Appellant submits that the rejections of claims 1-6, 9-18 and 21-25 are improper and therefore requests reversal of the rejections as applied to the appealed claims and allowance of the entire application.

Authority to charge the undersigned's deposit account if necessary was provided on the first page of this brief.

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APPENDIX OF CLAIMS INVOLVED IN THE APPEAL
(S/N 10/570,050)

1. A composite filter comprising an electronic circuit including at least two cascading filters of different orders and having passband ripples with respect to signal gain of the respective filter at frequencies in a passband of the respective filter and nearly equal in magnitude and out of phase with respect to each other in order to minimize a passband ripple in the composite filter, wherein the orders of the two cascading filters differ in value by exactly one.

2. A composite filter as claimed in claim 1, characterized in that the magnitude of the passband ripples in the at least two cascading filters are equal.

3. A composite filter as claimed in claim 1, characterized in that at least one of the at least two cascading filters includes a digital filter.

4. A composite filter as claimed in claim 1, characterized in that at least one of the at least two cascading filters includes an analog filter.

5. A composite filter as claimed in claim 1, characterized in that at least one characteristic of the at least two cascading filters is selected to minimize the passband ripple in the composite filter.

6. A composite filter as claimed in claim 5, characterized in that the at least one characteristic includes the order of the at least two cascading filters.

9. A composite filter as claimed in claim 5, characterized in that the at least one characteristic includes a bandwidth of the at least two cascading filters.

10. A composite filter as claimed in claim 5, characterized in that the at least one characteristic includes a stopband attenuation of the at least two cascading filters.

11. A method for passband ripple cancellation in cascading filters to minimize a passband ripple in a composite filter comprising the steps of: providing, in an electronic circuit, at least two filters of different orders and having passband ripples with respect to signal gain of the respective filter at frequencies in a passband of the respective filter and nearly equal in magnitude and out of phase with respect to each other in order to minimize the passband ripple in the composite filter, wherein the orders of the two cascading filters differ in value by exactly one.

12. A method as claimed in claim 11, characterized in that the magnitudes of the passband ripples in the at least two cascading filters are equal.

13. A method as claimed in claim 11, characterized in that at least one of the at least two cascading filters includes a digital filter

14. A method as claimed in claim 11, characterized in that at least one of the at least two cascading filters includes an analog filter.

15. A method as claimed in claim 11, characterized in that at least one filter characteristic for the at least two cascading filters is selected to minimize the passband ripple in the composite filter.

16. A method as claimed in claim 15, characterized in that the at least one filter characteristic includes a bandwidth for the at least two cascading filters.

17. A method as claimed in claim 15, characterized in that the at least one filter characteristic includes a stopband attenuation for the at least two cascading filters.

18. A method as claimed in claim 15, characterized in that the at least one filter characteristic includes an order for the at least two cascading filters.

21. The composite filter of claim 1, wherein one filter of the two cascading filters is a third order filter and another filter of the two cascading filters is a fourth order filter.

22. The composite filter of claim 1, wherein at least one of the cascading filters is an infinite impulse response filter.

23. The composite filter of claim 1, wherein at least one of the cascading filters is a finite impulse response filter.

24. The method of claim 11, wherein the step of providing in an electronic circuit at least two filters is implemented such that the combined frequency response of the at least two filters has a peak ripple less than about 0.10 dB at around 7.8 MHz.

25. The method of claim 11, further including the step of performing a low-pass to bandpass transformation on each of the at least two filters.

APPENDIX OF EVIDENCE

Appellant is unaware of any evidence submitted in this application pursuant to 37 C.F.R. §§ 1.130, 1.131, and 1.132.

APPENDIX OF RELATED PROCEEDINGS

As stated in Section II above, Appellant is unaware of any related appeals, interferences or judicial proceedings.